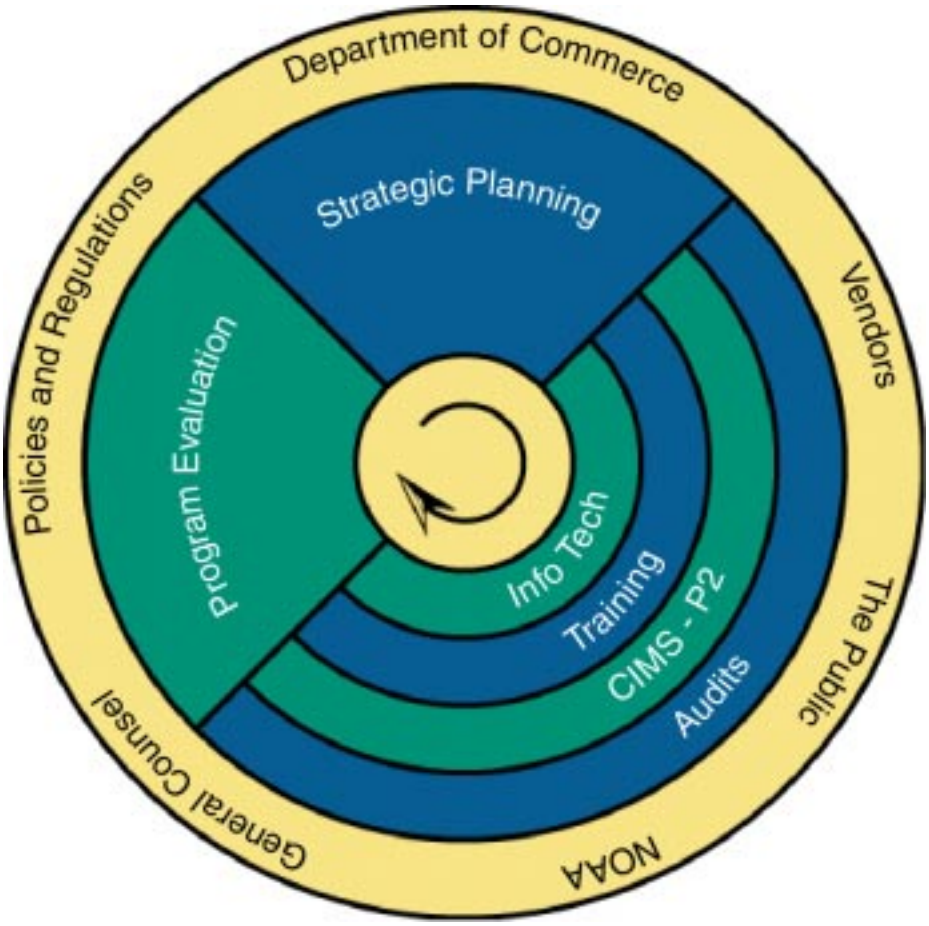
NOAA Environmental Compliance Program Concept of Operations Document – Draft November, 1998



"Environmental concepts will be integrated totally into the organization, and will become an inherent part of all NOAA operations and activities."

- Proceedings of the NOAA Environmental Compliance Program GPRA Meeting

I. About this Document, An Abstract

The discipline of Environmental Compliance Programs within the civilian Federal sector is characterized by best management practices such as those defined in the Code of Environmental Management Principles (CEMP) and the NOAA Environmental Compliance Program (NECP) Strategic Plan. These practices, when implemented in a cyclical and process-oriented manner, result in a performance advantage for the agency in question. These best management practices, once identified, can be supported and further enabled through the focused and strategic implementation of a sound information systems architecture.

This document further outlines the core functions and best management practices in a manner that recognizes the need for an effective, process-oriented, implementation. Structuring the content in this way is intended to produce a model for the optimal movement and management of environmental information throughout the organization. The anticipated result of implementing the systems architecture in this manner is a compliance program that enables "Best in Class" performance and continuous improvement toward the program's core vision of an organization permeated and characterized by sound environmental practices and awareness.

II. Figures

III. Glossary

IV. The Context Diagram Explored and Explained

The process for defining an Environmental Information System (EIS) is fundamentally the same as any creative undertaking. It begins by evaluating the top-level subject matter and the environment in which the system functions. One type of model used to represent this information is the context diagram.

The context diagram, as it will be used in this document, identifies the following system groupings:

- The drivers and constraints -- The regulatory and strategic motivations for carrying out specific activities.
- The system's major suppliers – Groups inside and outside of NOAA that provide products, services and information to support the operation.
- The supporting functions – Those activities that support and enable the organization.

- The customers that the system services.
- The core functions that characterize the system in the eyes of those that it services.

The figure on the front page of this document (heretofore referred to as "figure one") is a context diagram for the EIS envisioned for the NECP. The presentation of the figure differs slightly from traditional context diagrams. Therefore, it is important to take a moment to consider and understand its anatomy. Doing so will help the reader to follow the ideas presented in this document in their intended context.

- The drivers and constraints for the NECP are represented by the functions of Strategic Planning and Program Evaluation. The logic behind this is that, while external entities are the ultimate influencing factors for the organization, it is the role of leadership to filter these requirements and to drive change within the organization. As such, the Strategic Planning and Program Evaluation functions of the system represent to the organization its external requirements and its supply chain.

- For the same reasons discussed in item one above, the suppliers and customers are represented within this system by the strategic planning and program evaluation functions.

- The supporting functions are shown in the inner most arc at the bottom right portion of figure-1. Within the Code of Environmental Management Principles these functions are referred to as Enabling Systems. In order to coincide with the terminology of NECP's strategic plan, these systems are referred to as "Information Technology" and "Training" in this document.

- The core functions are represented at the lower portion of the figure. They are CIMS-P2 and Audits.

In addition to the primary components of a traditional context diagram, Figure-1 illustrates a set of top-level, sequential processes. In effect, strategic planning leads to implementation, which in turn leads to program evaluation and changing policies that hone and extend the performance advantage of the program. This concept is illustrated by the semicircular arrow at the center of figure-1. The concept is further developed in figure-2 below.

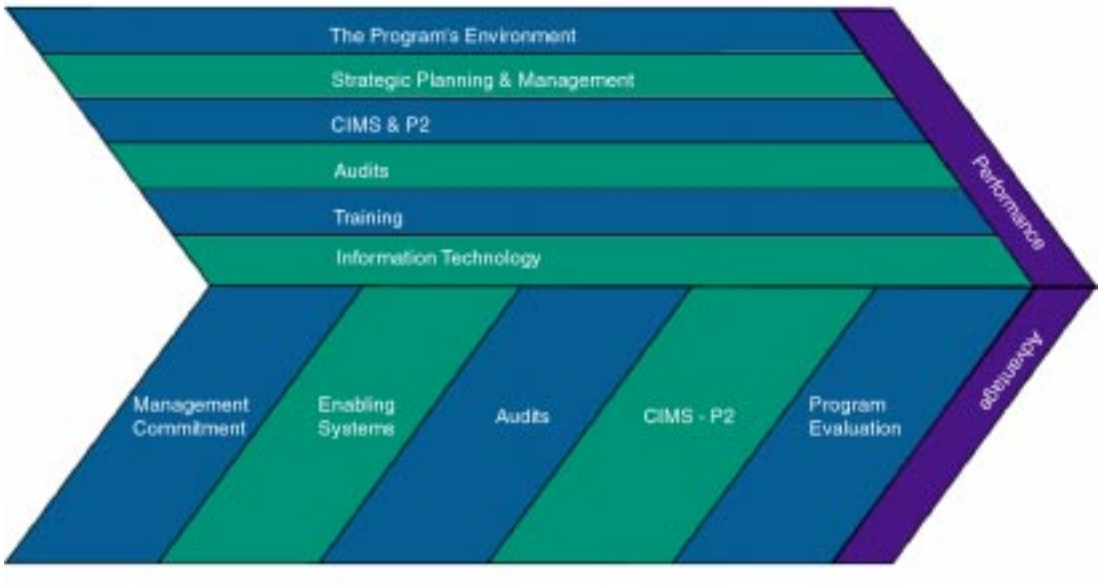


Figure - 2

V. The Environmental Compliance Program – An Overview

Per the context diagram described in the previous section, the NECP undertakes an iterative performance improvement process. Page thirteen, Figure 3, of the program's strategic plan illustrates this clearly when it describes the phases of planning, implementation and program evaluation. Within these top-level cycles there is a lower level of decomposition that can be represented as system modules. Processes specific to each top-level phase of the lifecycle are implemented in both sequential and parallel cadence. The major tasks for strategic planning follow each other sequentially to build a product of services that begin the realization of a performance advantage. In the implementation phase, the top level functions run in parallel. This is true to the real world representation of this phase which can be found in the corporate teams outlined in the NECP Strategic Plan. Finally, the program evaluation phase of the lifecycle returns to a series of sequential activities that are designed to maximize the organization's positive impact against its own performance barriers.

VI. Program Strategic Planning

The strategic planning phase of the NECP lifecycle is the organization's primary navigational instrument. The program's leadership serves as a filter for the dynamic, external environment of shifting requirements and, in effect, becomes the principal driver for the other activities in the lifecycle. While other stages of the program lifecycle are exposed to the program environment, the strategic planning function is supreme as a direction-finding process. To draw an analogy, it is like the eyes of an organism while the Implementation and, to a lesser extent, the Evaluation phases experience the program environment through direct contact - in a manner something akin to the sense of touch. This is a necessary artifact of the effort and focus involved in the internal evaluation and effort characterized by these functions. However, it keeps long range planning beyond the practical reach of the implementation process.

This view of the program is not meant to imply that leadership is acting unilaterally. It is clear from the strategic plan that the corporate teams will play an active role in determining the program's destiny. However, final responsibility for achieving the program's vision belongs to management. Given this, it is important to evaluate the processes of strategic planning and define the means by which this function can benefit from information technology. The top level modules that this document will consider are "Policy and Evaluation," "Coordination," and "Environmental Stewardship."

One final point is that the steps, or modules, of the strategic planning system are characterized by three perspectives. These are the external (forward-looking, visionary), internal (process improvement) and internal/external (the program's relationship to its environment) perspectives. This document will not attempt to explore the significance of this. However, it is interesting to note that the cadence at which the program switches between these perspectives decreases during the implementation phase and then increases as its cycle reaches a point of renewal in the program evaluation phase. This will become apparent when the reader reaches the portion of this document that deals with program evaluation.

A. Management Commitment (Strategic Vision and Oversight)

The CEMP identifies management commitment as one of the fundamental principles to be considered in the implementation of a self-optimizing environmental compliance program. The principle is characterized by policy development and evaluation; program coordination and environmental stewardship.

These three top level functions utilize the following data elements:

- Personnel (de)

- Regulations (de)
- Performance Indicators (de)
- Findings (de)
- Chemical Quantities (de)
- Budgets (de)
- Personnel (de)
- Training Requirements (de)

1. Policies and Evaluation

At this stage, management evaluates the external factors that should drive policy within the environmental program. This characterizes an external, forward looking view for the organization. To accomplish this task NECP will prepare a mission statement, evaluate existing precedents and identify industry best practices.

a. Prepare a Mission Statement

Preparation of the mission statement is collaborative and involves all members of the program at one stage or another. The initial implementation of this effort culminated in the January, 1998 GPRA meeting where environmental and safety personnel convened to draft the beginnings of the program's strategic plan. As NECP passes through iterations of its lifecycle and experiences changes in its environment, the organization will want to revisit, review and, perhaps, revise its mission statement. Therefore, the program's self definition is likely to occur repeatedly over time and should be recognized as part of an on-going process.

b. Evaluate Existing Precedents

The primary work activities of this task are characterized by conference attendance, review of organizations receiving programmatic awards for environmental compliance, and a review of regulatory changes.

c. Identify Industry Best Practices

Historically, the process for identifying industry best practices has been to apply the experience of top-level management and environmental professionals in the organization. While this practice will continue, the completion of the first formal NECP lifecycle as it is defined in the strategic plan will afford management the opportunity to take a more refined and objective approach to the process. This is necessary if the program is to experience continually increasing performance toward its goal.

2. Coordination (Internal View)

The coordination function of NECP is characterized by nine top-level functions. These are:

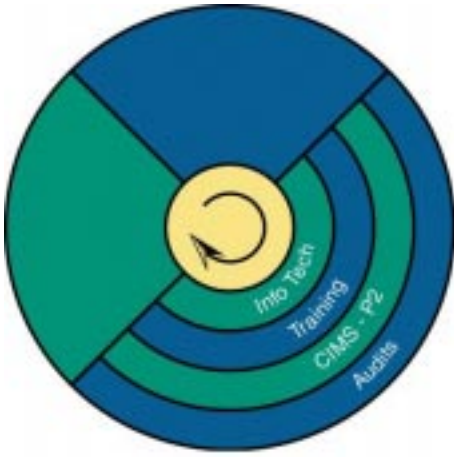
a. Prioritize Environmental Liabilities and Risks
b. Review Performance Indicators
c. Assign Management Responsibilities
d. Distribute Corporate Team Proceedings
e. Bind Environmental Performance to Organization-Wide Evaluation Criteria
f. Coordinate and Review Budget Requirements
g. Ensure Adequate Staffing at All Levels
h. Perform Outreach Activities
i. Work with the Training Team to Provide Management and Workers with Awareness Training

3. Environmental Stewardship (External/Internal Perspective)

The environmental stewardship affords NECP leadership the opportunity to provide orientation to employees who are currently or will be working in a programmatic area identified as a risk by the program evaluation process. As an example, the CEMP recommends activities such as providing discussions and insight into the impacts of product lifecycles on environmental compliance. This sort of outreach may be one of the most important activities NECP can undertake to further its vision.

(Insert Figure 1.1 - "The Permeable Barrier of NOAA Environmental Compliance and Safety Program (NECSP))

VII. Implementation



Implementing the vision and objectives identified during the strategic planning process is the organization's defining act. It impacts the way in which the agency and its department will be viewed in the eyes of the program's peers and in the eyes of the public. Perhaps as a result of their visibility, these processes consume most of the environmental compliance program's daily activities. The CEMP recommends that environmental implementation functions pursue "best in class" activities such as those identified in the ensuing paragraphs of this section. In addition, the CEMP recommends that implementation functions be supported by enabling systems in the areas of training, structural support, information systems, and corporate team communications.

The result of this structure is an implementation phase that runs four top-level processes in parallel. These processes map directly to the activities of the corporate teams defined in the NECP strategic plan. They are the CIMS-P2, Audits, IT and Training processes. Some additional processes discussed here are shared among, and relevant to, all of the corporate teams. These are emergency preparedness and corporate team communications. These processes will

also be discussed.

A. Compliance Assurance and Pollution Prevention

A principle identified by the CEMP is that of compliance assurance and pollution prevention. This principle, when analyzed in depth maps directly onto the implementation phase of the lifecycle identified on page 13 of the NECP strategic plan.

The data entities that support the compliance assurance and p2 functions are:

- Facilities
- Vendors
- Surveys
- Personnel
- Audit Schedules
- CAPs
- Audit Definition
- SOWs
- Chemical Quantities
- MSDS
- Chemical Substitutes

1. Assessments

The first step in the assessments process is to establish standard operating procedures for conducting audits. Furthermore, these procedures must account for Federal , state and local regulations.

The next logical step in compliance assessment is to establish baseline and on-ongoing performance within the organization. This is done through the facility survey and audit process which will be discussed below.

a. Identify Facilities that are Due for an Audit – To identify facilities that are due for an audit, NECP classifies facilities into high and low risk categories. This is exemplified in Attachment 2 of NECP's audit policy. The table below illustrates some of the major considerations that go into deciding whether or not a facility should be audited.

TYPE OF SITE	FREQUENCY (years) TYPICAL	FREQUENCY (years) LOWER RISK*	ON-SITE AUDIT OR SURVEY
Chemical Laboratory	3	5	Audit

Industrial or Storage Facility	3	5	Audit
NOAA Ship	3	5	Audit
Environmental Trigger	Depends on Trigger	Depends on Trigger	Audit
Facility with Over 200 People	5	7	Audit
Unstaffed Sites	***		
All Others	5	7	Audit

b. Assign Audit Teams – Once facilities have been selected for an audit it is necessary for NECP to identify the teams that will conduct the audits. Audit teams may consist of program employees, contractors and NOAA personnel undergoing training through a program of environmental mentorship.

c. Notify Facilities – After facilities have been selected and teams have been assigned, headquarters notifies the facility that it will be audited.

d. Coordinate Audit Dates – Audit team leaders coordinate their visit with facility personnel.

e. Conduct Facility Surveys – Headquarters evaluates the facility without committing the time and personnel required by an audit team. The facilities retain primary responsibility for filling out the surveys, making changes and submitting the information to headquarters. The responses are reviewed for environmental triggers. A random sample is selected for a visit.

f. Issue Pre-Audit Questionnaires – Prior to the audit, the audit team leader will issue pre-audit questionnaires to be filled out by the facility. The information provided by the questionnaires will serve to guide the attention of the auditors to specific problem areas.

g. Collect Responses – The facility's responses will help the survey team determine whether the facility should be audited. In the case of a pre-audit questionnaire, the facility's responses will indicate to auditors some of the things they should look for upon arriving at the site.

h. Perform Entrance Brief – The first step once the auditors are on site is to conduct an entrance briefing. This affords auditors the opportunity to verify the quality of audit information and provide corrections back to headquarters.

i. Record Facility Findings – During a tour of the facility, the auditors will record findings.

j. Document Immediate Corrective Actions -- It may be possible for facility personnel to correct findings as they occur. In this event, the finding will be recording for future consideration as a training item.

k. Assess Program Areas – This assessment will be based upon the program areas described in the audit team's statement of work.

l. Perform an Exit Brief – Prior to leaving the facility the auditing team will present and discuss the draft findings from the audit to the facility point of contact.

m. Author Draft and Final Audit Reports

n. Perform a QA/QC Check on the Findings of the Audit Team

o. Track Regulatory Initiatives – This step is an opportunity to evaluate the external environment for new regulatory initiatives. If new initiatives would change the nature of a finding or would change the consequences of such a finding, headquarters, line offices and RECOs should adjust the finding's priority accordingly.

p. Inform and Coordinate with Local Regulatory Authorities – This task is carried out only when there is a need as defined by regulations, policies or other best management practices.

q. Author Corrective Action Plans

r. Identify and Implement P2 Measures as a Primary Means of Addressing Corrective Actions

s. Plan, Track, Schedule and Report on Corrective Actions

t. Determine Whether to Elevate the Corrective Action Plan to a Formal Project

2. Emergency Preparedness

The emergency preparedness function is carried out by all members of the NECP. The information relied upon to support an effective policy is as follows:

- Risk Areas
- Policies (de)
- Emergency Contact
- Policies (de)

The work functions for Emergency Preparedness are as follows:

a. Perform Accident Risk Analysis

b. Develop Procedures to Address Accidents

c. Identify Hazards Associated with Organizational Operations

d. Devise Appropriate Measures to Address and Mitigate Identified Hazards

e. Coordinate with Local Fire, Law Enforcement

3. Pollution Prevention and Conservation

The pollution prevention function relies on the following types of information:

- Chemical Quantities (de)
- Facilities (de)
- MSDS (de)
- Chemical Transactions (de)
- Chemical Groupings
- Chemical Substitutes (de)
- Risk Management

The functions that support Pollution Prevention are:

a. Implement a Program for P2 Opportunity Identification

b. Identify and Implement Opportunities to Reduce the Use of Toxic Materials

c. Perform Life Cycle Analyses to Assess Overall Environmental Impacts

d. Implement a "Repair or Replace" Program for Capital Equipment

e. Implement a Recycling Program that Leverages a Policy of Procuring Recycled Materials

(1) The CIMS is a primary example of P2 functionality within NOAA. It has the following functions and characteristics:

(a) Store Chemicals

i) Acquire and Store Current MSDS for Hazardous Chemicals Kept on Site

ii) Affix Warning Labels to Containers Holding Hazardous, or Potentially Hazardous, Materials

iii) Store Chemicals in a Safe and Approved Manner

(b) Plan for Chemical Spills and Other Identifiable Risks Associated with the Storage and Use of Hazardous Chemicals

i) Track Quantities of Hazardous Materials

ii) Report Quantities of Hazardous Materials

(c) Chemical Waste Management

i) Tracking Information on Waste Containers

ii) Generate Manifests and Other Reports on Wastes

B. Enabling Systems

The third principle of the CEMP, enabling systems, is represented here as part of the implementation phase of the program lifecycle. However, it should be noted that enabling systems are intended to support the entire lifecycle of the program. Activities such as training and information systems will enable the program evaluation process and, later, the strategic planning process. This idea will be discussed further in the training and information systems sections of this document.

The data elements that support the enabling systems principle are as follows:

- Courses (de)
- Training Requirements (de)
- Personnel (de)
- Policies (de)
- MSDS (de)
- Regulations (de)

1. Training – The training function has its own internal phases of preparation, implementation and evaluation. The preparation phase enables the NECP to identify core training requirements as well as extra requirements that are desirable or necessary for the successful execution of one's assignments. After preparation the classes are offered to NOAA environmental personnel as appropriate. Finally, the classes offer the opportunity for student evaluation. This will help program administration to improve course implementation and to offer courses that accurately address the training requirements of environmental personnel.

a. Develop a Core Curriculum to be Required of All Personnel – NECP personnel require

training in specific key areas in order to carry out general activities to support the program. It is the responsibility of the training group to identify these activities and to provide a core curriculum that adequately addresses needs. In addition, as part of NECP's outreach efforts management may consider offering fundamental environmental awareness training to all NOAA personnel. This could take the form of an orientation or some sort of fundamental policy material to be distributed to employees as needed.

b. Identify Additional, Job-Specific, Training Requirements – In addition to the core curriculum requirements, certain positions within the NOAA environmental compliance community require specialized training. The training group will work with these people to provide courses that meet the requirements of the position.

c. Determine the Availability of Outside and Inside Training – Once training requirements are identified, the training team will evaluate training sources. This evaluation will include a catalog and an informal assessment of internal and external training providers. Course responsibilities will be assigned using the best mixture of internal and external resources that the training group can identify.

d. Establish an In-House Training Group to Track the Program – The in-house training group will write its own charter, identify critical training areas and propose a budget for the execution of training requirements. This is the guiding group for the training supporting system.

e. Establish Periodic Refresher Training – The rate at which refresher training is required will equal the rate at which it is offered. This provides a proactive measure for the reduction of findings by equipping environmental personnel with the skills they require to carry out their work.

f. Obtain Employee Feedback on Training – In order to ensure that training adequately prepares environmental personnel for their job tasks, the training group will collect and evaluate course feedback from within the NECP community. The training group will collect this feedback either immediately upon course completion or shortly after to ensure that student insights are freshly captured.

g. Investigate Alternative Training Methods – In addition, to traditional classroom training, the training group will evaluate other training approaches that account for new and changing insights into the training profession and its best techniques.

2. Information Management

(1) Management Functions

(a) Create an In-House Group to Document Current Requirements and New Trends in Information Management

(b) Review Current Capabilities to Determine Whether they Are Sufficient to Meet Expected Needs

(c) Develop Procedures for Evaluating New Information Management Projects

(d) Develop QA/QC Procedures for Secure and Valid Collection, Management and Dissemination of Information Obtained through the Environmental Program

(2) Information Storage and Retrieval Functions

(a) Maintain Documentation on the Properties of Materials Used by the Organization, Such as MSDSs

(b) Establish a Resource Center for the Storage and Distribution of Regulations, Guidance Documents and Other Publications Relating to Environmental Management

(c) Implement the Use of Electronic Networks and On-Line Databases and Libraries

(3) Strategic Services

(a) Develop Methods to Employ Environmental Management System Data

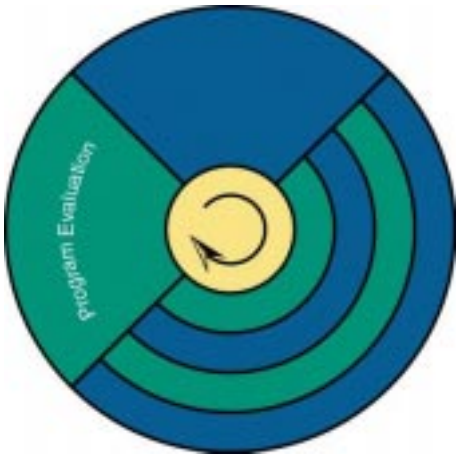
3. Corporate Team Communications

a. Assign Each Corporate Team a "Shepherd" to Act as the Group's Point of Contact

b. Provide Regular Status Updates on Team Activities

c. Develop a Formal System to Allow Personnel to Anonymously Communicate Environmental Concerns to Upper Levels of Management (Figure 3-1 "Anonymous Communication Model,")

VIII. Program Evaluation



Program evaluation provides the NECP with its first official opportunity to review, revise and fine tune its operations. As with the strategic planning process, the top level modules that guide the process take place in a sequential order that is designed to result in recommendations for process improvements that can be incorporated into the next program cycle.

It is worthwhile to note that the CEMP recommends the involvement of an external party in the self evaluation process. In fact, each module in this process is characterized by an internal, external and combined internal/external view of the organization. This concept is further explored in this section.

Program evaluation is supported by the following data elements:

- Findings (de)
- CAPs (de)
- Projects (de)
- Budgets (de)
- Chemical Quantities (de)
- Policies (de)
- Training (de)

A. Implement Performance and Accountability Measures

Implementing performance and accountability measures is recognized by the CEMP as a primary principle for implementing a high quality environmental program. It is characterized by role clarification and participatory performance evaluation.

1. Assign Tasks

a. Identify Specific Senior Managers at the Agency and Assign to them the Authority to Ensure Compliance with Established Environmental Standards

b. Clearly Define the Roles, Relationships and Responsibilities of Personnel and Groups Directly Involved in the Environmental Program

c. Develop a Policy Detailing the Agency's Approach to Accountability

2. Set Performance Standards

a. Work with Responsible Parties to Identify Organizational Performance Goals

b. Develop Performance Evaluation Procedures

c. Prepare an Awards Program (Positive Reinforcement)

d. Prepare Disciplinary Mechanisms to Deal with Willful Non-Compliance (Negative Reinforcement)

B. Measure and Improve Upon Performance

Measurement and improvement is the fifth principle espoused in the CEMP. It's implementation is characterized by subjective and objective analysis of the program's effectiveness during the present cycle.

1. Aggregate Performance Measurement Indicators (Figure 5.1 - "Direction/Performance Defined") (Preliminary/Internal Assessment)

a. Undertake a preliminary and internal data aggregation process

b. Identify a Third Party Assessment Team (Secondary/External Assessment)

c. Define the Scope and Type of the Assessment (Secondary/External Assessment)

d. Perform Results, Reporting, Trend and Root Cause Analysis (Tertiary/External and Internal Assessment)

2. Undertake Benchmarking Activities

a. Identify Areas for Improvement from Aggregated Data (Preliminary/Internal Assessment)

b. Develop a Self Assessment Matrix (SAM) (Figure 5.2 - "The Self Assessment Matrix") (Preliminary/Internal Assessment)

c. Map Performance Indicators from Other Organizations into the SAM (Secondary/External Assessment)

d. Analyze the Results to Identify Best Management Practices in Other Organizations (Secondary/External Assessment)

e. Explore the Possibility of Mentoring Another Organization (Tertiary/External and Internal Assessment)

3. Conduct Process Improvement Planning

a. Evaluate the Previously Identified Root Causes of Negative Performance Indicators (Preliminary/Internal Assessment)

b. Solicit Suggestions for Improvement from Agency Personnel (Preliminary/Internal Assessment)

c. Conduct and Collect Case Studies Pertaining to the Operations of Best In Class Performers (Secondary/External Assessment)

d. Review Contemporary Management Philosophies (Secondary/External Assessment)

e. Develop a Lessons Learned Program (Secondary/External Assessment)

f. Incorporate Improvements into the Next Planning Cycle (Tertiary/External and Internal Assessment)

VIII. Conclusion

It is critical to the proper implementation of a strategically valuable information system that requirements be defined in the context of a living, viable business model. While it is useful to evaluate the components of a traditional context diagram at this stage of program and information systems development, the organization and the system designers must take care not to overlook the relationships between top-level processes. The processes described in this document relate to one another in a way that increases the performance advantage of the program. To miss this critical perspective on the architecture at this stage would jeopardize the long-term success of both the environmental program and the enabling system that this document begins to define.

IX. Appendices

A. Work/Responsibility Matrix

B. Work/Information Matrix

C. Primary Data Entities

(1) Mapping of Entities to current "Real-World" Implementations

(2) Top-Level Data Hub Concept

D. Application Portability Profile (APP)

(1) The Concept Explored

(2) Some Specific Design Considerations (Evaluating Design Decisions)

(3) Some Specific Examples (Select Products and Implement the Evaluation Methods Outlined in the NIST APP)

E. Work Function/Documentation Matrix